

2.6 Prove Statements about Segments and Angles

Proof—a logical argument that shows a statement is true

Theorem—a statement that can be proven

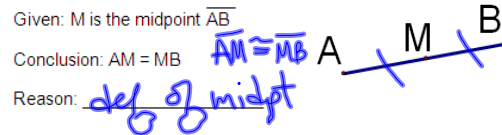
Examples of how these are used.

Give the reason for the conclusions below.

1. Given: M is the midpoint \overline{AB}

Conclusion: $AM = MB$

Reason:



2. Given: diagram to the right

Conclusion: $CA + AT = CT$

Reason:

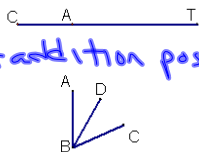
S.A.P. segment addition postulate

3. Given: diagram

Conclusion: $m\angle ABD + m\angle DBC = m\angle ABC$

Reason:

AAP
∠ + post. angle addition postulate



4. Given: \overrightarrow{BD} bisects $\angle ABC$

Conclusion: $m\angle ABD = m\angle DBC$

Reason:

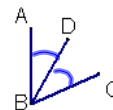
def. of ∠ Bis.

5. Given: $\overline{AB} \cong \overline{CD}$

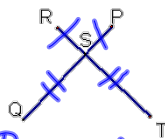
Conclusion: $AB = CD$

Reason:

def of ≅



Example 1

Given: $RS = PS$; $ST = SQ$ Prove: $RT = PQ$ 

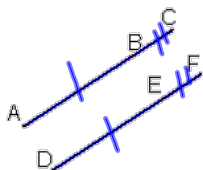
Statements	Reasons
① $RS = PS$ $ST = SQ$	① Given
② $RS + ST = PS + SQ$	② Addition
③ $RS + ST = RT$ $PS + SQ = PQ$	③ S.A.P.
④ $RT = PQ$	④ Subst.

Example 2

Given: $LM = NO$ Prove: $\overline{LN} \cong \overline{MO}$ 

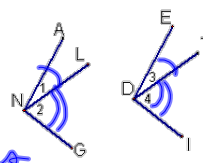
Statements	Reasons
① $LM = NO$	① Given
② $MN = MN$	② Reflexive
③ $LM + MN = MN + NO$	③ Addition
④ $LM + MN = LN$ $MN + NO = MO$	④ S.A.P.
⑤ $LN = MO$	⑤ Subst.
⑥ $\overline{LN} \cong \overline{MO}$	⑥ D.O.S.

DO:

Given: $AB = DE$; $BC = EF$ Prove: $AC = DF$ 

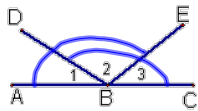
Statements	Reasons
① $AB = DE$ $BC = EF$	① Given
② $AB + BC = DE + EF$	② Add
③ $AB + BC = AC$ $DE + EF = DF$	③ SAP
④ $AC = DF$	④ Subst.

EXAMPLE 3:

Given: $m\angle 1 = m\angle 3$; $m\angle 2 = m\angle 4$ Prove: $m\angle ANG = m\angle EDI$ 

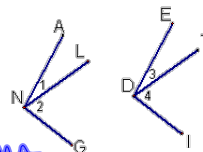
Statements	Reasons
① $m\angle 1 = m\angle 3$ $m\angle 2 = m\angle 4$	① Given
② $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	② Add.
③ $m\angle 1 + m\angle 2 = m\angle ANG$ $m\angle 3 + m\angle 4 = m\angle EDI$	③ \angle + Post.
④ $m\angle ANG = m\angle EDI$	④ Subst.

EXAMPLE 4:

Given: $m\angle ABE = m\angle DBC$ Prove: $m\angle 1 = m\angle 3$ 

Statements	Reasons
① $m\angle ABE = m\angle DBC$	① Given
② $m\angle ABE = m\angle 1 + m\angle 2$ $m\angle DBC = m\angle 2 + m\angle 3$	② A.A.P.
③ $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	③ Subst.
④ $m\angle 1 = m\angle 3$	④ Reflexive
⑤ $m\angle 1 = m\angle 3$	⑤ Subtr.

EXAMPLE 5:

Given: $m\angle ANG = m\angle EDI$; $m\angle 1 = m\angle 3$ Prove: $m\angle 2 = m\angle 4$ 

Statements	Reasons
① $m\angle ANG = m\angle EDI$	① Given
② $m\angle ANG = m\angle 1 + m\angle 2$ $m\angle EDI = m\angle 3 + m\angle 4$	② AAP
③ $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	③ Subst
④ $m\angle 1 = m\angle 3$	④ Given
⑤ $m\angle 2 = m\angle 4$	⑤ Subtraction

HW see new homework handout